

# Laboratory Board for Studying the Half-Bridge Power Electronic Converters

Daniel Sticea, Mihai Albu, Gabriel Chiriac

“Gheorghe Asachi” Technical University of Iasi, Faculty of Electrical Engineering, Iasi, Romania  
danisticea@yahoo.com, gchiriac@tuiasi.ro, [albu@tuiasi.ro](mailto:albu@tuiasi.ro)

**Abstract**— The paper describes a laboratory board made by the authors to study the power electronic converters whose topology is a simple half bridge structure with power transistors and recovery diodes. The board is conceived to be easily integrated in a reconfigurable laboratory setup and includes a half bridge IGBT module, a double MOS gate driver and a PWM modulator achieved with a microcontroller. Using the microcontroller program it can be changed the PWM control technique, depending on the studied converter type, chopper or single-phase PWM inverter. Also, it can be sets the converter switched frequency, the dead time value of the complementary PWM control signals and can be adjusted the duty ratio of the transistors. The last value can be manually changed with the help of a potentiometer or can be changed via a serial communication line. Based on this facility, more identical boards can be simultaneously used in a control area network (CAN).

**Keywords**— *half bridge power electronic converters; laboratory board; multiple experiments; reconfigurable setup*

## REFERENCES

- [1] User Manual, Power Electronics Laboratory, Department of Electrical and Computer Engineering, University of Minnesota, [http://people.ece.umn.edu/groups/power/labs/pe/pe\\_manual.pdf](http://people.ece.umn.edu/groups/power/labs/pe/pe_manual.pdf)
- [2] N. Mohan, T. Undeland, W. Robbins, Power Electronics: Converters, Applications and Design, Third Edition, Published by John Willey & Sons Inc., USA, 2003.
- [3] [www.euedia.tuiasi.ro/lab\\_ep](http://www.euedia.tuiasi.ro/lab_ep); Lab.no.18, 19, 20
- [4] [www.semikron.com](http://www.semikron.com)
- [5] PIC18F4480 Data Sheet; <http://ww1.microchip.com/downloads/en/DeviceDoc/39637c.pdf>